FireFinder™

AS1603.4
OPERATORS MANUAL

Document No	G0109WO1
Model No	G0109
Serial No	…………………………………
Date of Manufacture	…………………………………
Revision	3

AMPAC TECHNOLOGIES PTY LTD

HEAD OFFICE
PERTH:

97 WALTERS DRIVE
OSBORNE PARK 6017
WESTERN AUSTRALIA

ISO 9001
QUALITY ASSURED FIRM
SGS

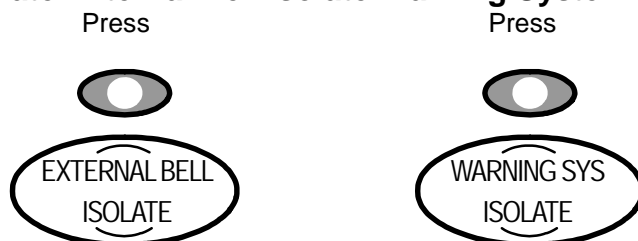|	
PH:	61-8-9242 3333
FAX:	61-8-9242 3334
E-MAIL:	info@ampac.net
Website:	www.ampac.net

NOTE: DUE TO AMPAC's COMMITMENT TO CONTINUOUS IMPROVEMENT
SPECIFICATIONS MAY CHANGE WITHOUT NOTICE.
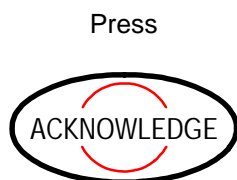
UNCONTROLLED DOCUMENT

1 Fire Brigade Responding To Alarm

1. **Indicators**   -**Alarm** Indicator Flashing.
-**Location** of Alarm on LCD Display.
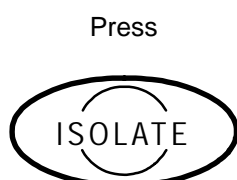-**First** Alarm Displayed.
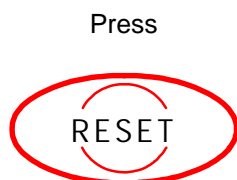
2. **Isolate External Bell Isolate Warning System**

Press   Press

EXTERNAL BELL ISOLATE   WARNING SYS ISOLATE

3. **Acknowledge Alarm**

Press

ACKNOWLEDGE

4. **Isolate Alarm**

Press

ISOLATE

5. **If multiple alarms exist repeat 3 and 4 for second alarm and so on.**

6. **To Reset Panel**

Press

RESET

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2 Table Of Contents

Ampac Technologies Pty Ltd
FireFinder^{TM} Operators Manual

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3   *About This Manual*

3.1   Purpose

The purpose of this manual is to assist you in the installation and operation of the *FireFinder^{TM}* Fire Detection System.

3.2   Scope

The information within this manual is only available to and for the use of personnel engaged in the installation and operation of the *FireFinder^{TM}* Fire Detection System.

3.3   References

FireFinder^{TM} Technical Manual

FireFinder^{TM} Detector manual

AMPAC Product Data Sheets

Australian Standards:

AS1603.4 - 1987 Automatic Fire Detection and Alarm Systems part 4 - Control and Indicating Equipment.

AS1670 - 1995 Automatic Fire Detection and Alarm Systems - system design, installation, and commissioning.

AS1851.8 - 1987 Maintenance of Fire Protection equipment part 8 - Automatic Fire detection and Alarm Systems.

AS1851.8-Supp 1-1990 System certificate and maintenance records.

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4 Non Disclosure Agreement

This contract has been entered into by the person or company user of this document (hereafter called the Trader) and AMPAC Technologies (hereafter called AMPAC) of 97 Walters Drive, Osborne Park Western Australia 6017. Under terms and conditions as specified hereunder.

Whereas AMPAC and the Trader for their mutual benefit and pursuant to a working relationship which may be established, anticipate that AMPAC will disclose in the form of this document, information of a secret, or confidential or proprietary nature (hereinafter collectively referred to as Proprietary Information).

Whereas AMPAC desires to ensure that the confidentiality of any Proprietary Information is maintained in accordance with the terms of this Agreement;

NOW, THEREFORE, in consideration of the foregoing premises, and the mutual covenants contained herein, the Trader hereby agrees as follows:

1. The Trader shall hold in trust and confidence, and not disclose to any person outside its organisation, any Proprietary information which is disclosed to the Trader by AMPAC under this Agreement. Proprietary Information disclosed under this Agreement may be used by the Trader only for the purpose of carrying out work on or with AMPAC supplied equipment and may not be used for any other purpose whatsoever.

2. The Trader shall disclose Proprietary Information received by AMPAC under this Agreement to persons within its organisation only if such persons are legally bound in writing to protect the confidentiality of such Proprietary Information.

3. The undertakings and obligations of the Trader under this Agreement shall not apply to any Proprietary Information which :

    1. is disclosed in a printed publication available to the public, is described in patent anywhere in the world, or is otherwise in the public domain at the time of disclosure;

    2. is generally disclosed to third parties by AMPAC without restriction on such third parties;

    3. is shown by the Trader to have been in its possession prior to the receipt thereof from AMPAC;

    4. is approved for release by written authorisation of AMPAC; or

    5. is not designated by AMPAC in writing or by appropriate stamp or legend to be of a secret, confidential or proprietary nature.

4. This Agreement will be binding upon and inure to the benefit of the parties hereto, and their respective successors and assigns.

5. This Agreement, and all rights and obligations hereunder, shall expire on the 10th anniversary of the date of issue of this document.

These terms are accepted by the Trader on receipt and retention of this document.

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5 System Overview

The *FireFinder^{TM}* is an Intelligent Analogue, Addressable and Conventional Fire Alarm Control Panel capable of supporting:

- Apollo Discovery and XP95 Intelligent Photoelectric, ionisation, and thermal (heat) detectors.
- Addressable Initiating Devices: Modules that monitor any conventional normally open contact such as supervisory switches and flow switches.
- Conventional two wire zone detector circuits
- Multiple input/outputs
- High Level Interfaces
- Graphical Interfaces
- Remote LCD mimics
- Remote LED mimics
- Peer to Peer networking
- Master Sub networking
- Master plus Data Gathering Panels networking

It is built to comply with the following standards:

- **Australian Standard:** AS1603.4 & AS 4428.1
- **New Zealand Standard:** NZ4512
- **European Standard:** EN54
- **Malaysian Standard:** MS1404

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6 Placing The System Into Operation

6.1 Unpacking

Carefully unpack the *FireFinder^{TM}*.
The package should include:
- *FireFinder^{TM}* Fire Panel
- An operators manual

6.2 Anti-Static Precautions

To prevent damage to panel components please ensure prior to touching or handling any of the wiring or printed circuit boards within the FIP that you are correctly earthed.

6.3 Working On The System

To prevent damage to panel components please ensure prior to unplugging any connector, connecting or disconnecting any wiring, removing or replacing any module or board, that both the Mains and Batteries have been isolated.

6.4 The Cabinet

The cabinets are painted as a standard Arch White Ripple (Special colours are available on request)
The door is key-locked and mounted with piano hinges.
The back- box has been engineered to provide ease-of-entry, with knockouts positioned to the top and rear to simplify cable entry.
The inner and outer door hinges are mounted on the left-hand side. The inner and outer door opens 100º.

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6.5 Mounting The Cabinet

The cabinet may be either surface or flush mounted. It should be placed in a clean, dry, vibration-free area. For flush mount panels a surround is required.

Knockouts are provided for either conduit or cable entry.

Open the front door. Use the keyhole mounting holes in the top corners and in the middle of the unit to mount it on the wall. Cables to connect the system to its external actuating devices are brought in through the knockouts on the top or rear of the cabinet.

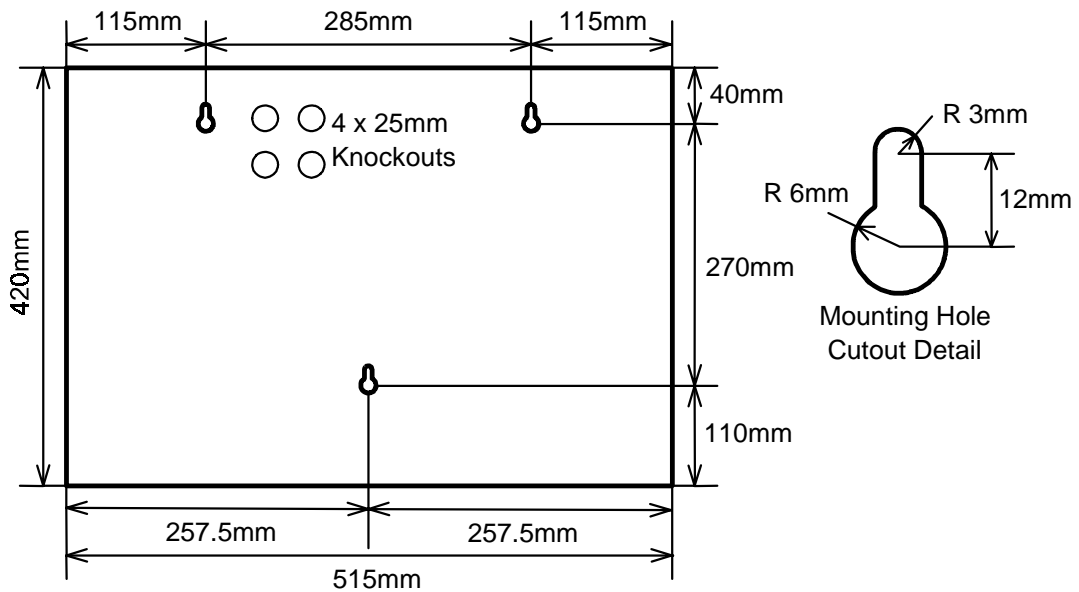*Fig 1: SP2 & SP4 FireFinder^{TM} Mounting Keyhole Details*

6.5.1 Mounting The Cabinet cont (SP8)

Fig 2 SP8 FireFinder^{TM} Mounting detail

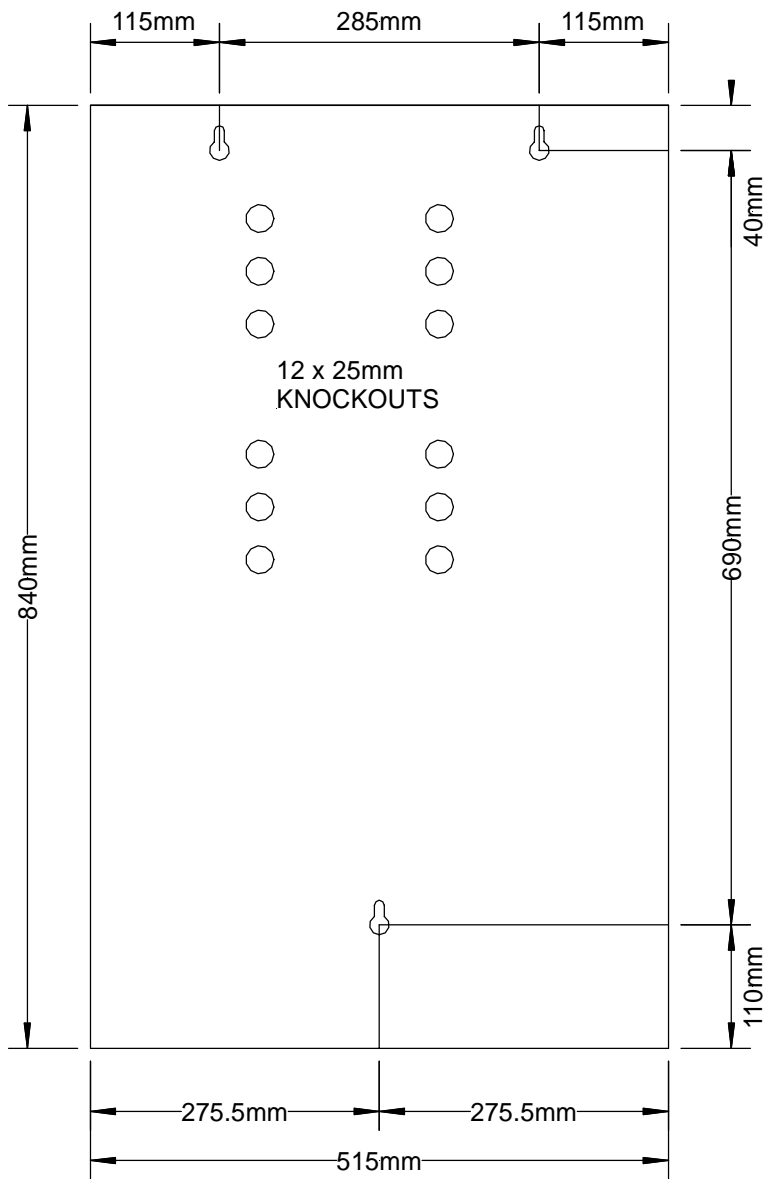| DOC No:G0109WO1.doc | DIR: L:\MANUALS | DATE: 30/11/00 | REVISION: 3 |

6.6 Connecting the Mains

Terminate the mains power to the 240 VAC switch terminal block, as shown in the diagram below.
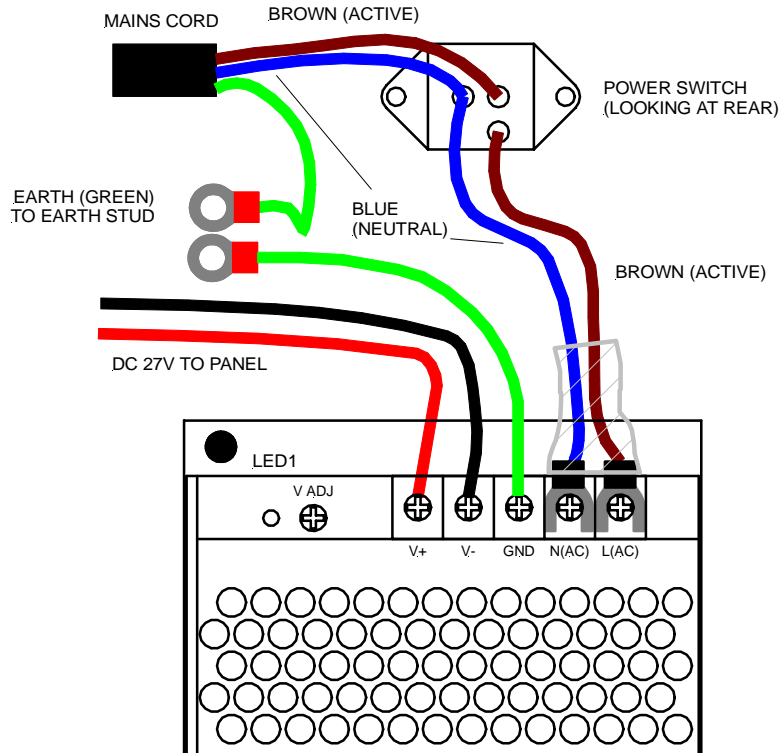

Fig 3: Mains Power Connection

6.7 *FireFinder^{TM}* **Description**

The following descriptions do not relate to specific cabinet sizes, as the size of each cabinet will vary dependant upon the amount of hardware fitted.

The heart of the *FireFinder^{TM}* consists of two boards that combine to form a **controller**. These boards are the Main Board (API–674) and the CPU board (API–675). When combined with a front panel board (API–690) this forms the basis for a *FireFinder^{TM}* panel. A single *FireFinder^{TM}* **controller** without an expansion board has the capacity to interface to (4) *FireFinder^{TM}* Slave CPU's (API-669) modules. Slave CPU's may interface to either 16 Zone Conventional Boards, Apollo Loop Termination Boards or Input/Output Modules. It also communicates with the Brigade interface Card (API-673).

The Main Board (API-674) mounts the CPU Board (API-675) and up to three *FireFinder^{TM}* Slave CPU's. The first slave CPU is permanently mounted on the Main Board (API-674). (See fig 4 and attached block diagrams). The *FireFinder^{TM}* Slave CPU's have the same software installed and their operation type is determined by the interface board into which it connects.

If the system is to be expanded above four modules an Expansion Board (API-688) is used. This expansion board contains *FireFinder^{TM}* Slave CPU No. 5 and three expansion sockets for three more *FireFinder^{TM}* Slave CPU's. This configuration allows for the maximum number of modules (8) which one **controller** can accommodate. If a system is required to expand beyond eight modules then either local networking using other **controllers** (up to a total of four within the one cabinet) may be fitted or external networking must be used.

The *FireFinder^{TM}* also provides an internal serial bus. This serial bus provides interfacing to the following modules. 32 zone mimic board (API-700), Pump indicator board (API-717), Valve indicator board (API-716) and Serial Relay Board (API-732).

A fan control module (FCM) (159-0020) is also available. This operates in conjunction with a slave CPU (159-0046) module. Up to 10 FCM's may be connected to one slave CPU.

Where a system exceeds the capability of one *FireFinder^{TM}* then other *FireFinder^{TM}* panels can be networked together to provide an expanded system containing multiple modules. It can be configured into different scenarios if required ie (Peer to Peer, Main sub, Stand-alone data gathering points).

This network bus can be accessed using either a Network Interface Card* (NIC API-724) and/or Controller Interface Card (CIC API-725). Modules that are supported on the network are Remote Led Repeater Board (API-715), Remote Liquid Crystal display (API-720, API-721), remote *FireFinder^{TM}* main panels and other *FireFinder^{TM}* remote data gathering panels.
The network configuration determines whether an NIC or a CIC or a combination of both is required.

*See the Technical manual for full network drawings
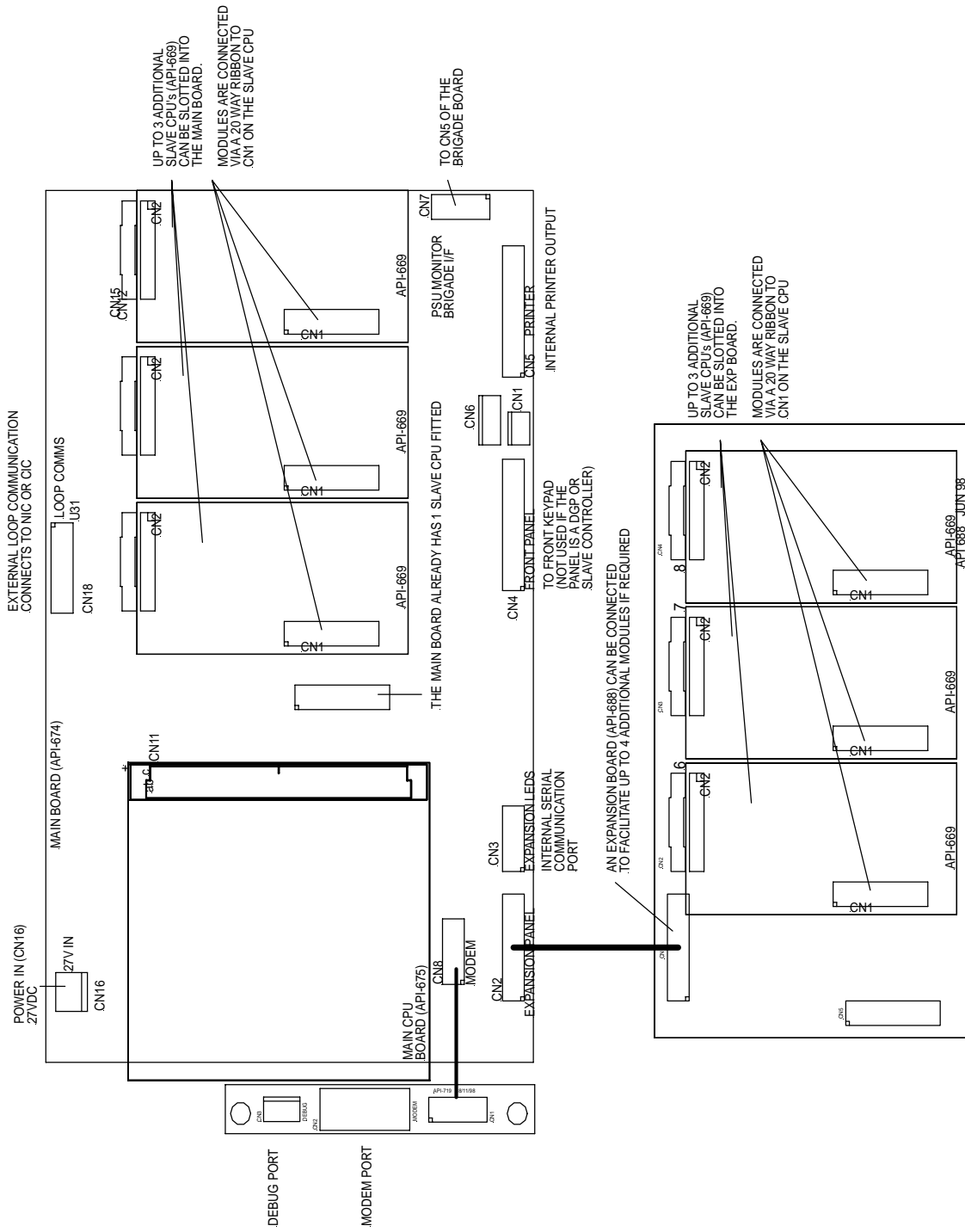
Fig 4: Single Controller board with Expansion Module

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6.8 List of Compatible *FireFinder*^{TM} Modules

- **Slave CPU (302-6990)**
- **Conventional Zone Board (302-6710)**
- **Apollo / Hochiki Loop Termination Board (302-7350)**
- **Fan Control Module (302-6800)**
- **16/16 Input / Output Board (302-6720)**
- **Expansion Board (302-6880)**
- **Output / Power Supply Monitor Board (302-6730)**
- **Pump Display Module (302-7170)**
- **Valve Display Module (302-7160)**
- **Zone Display (302-7000)**
- **8 Way Relay Board (302-6760)**
- **16 Way Input Board (302-6770)**
- **Printer (302-7350)**
- **Sounder/Bell controller Board (302-7420)**
- **Serial Relay Board (302-7320)**

Compatible Networking Devices

- **Network Interface Card (302-7240)**
- **Controller Interface Card (302-7250)**
- **LCD Mimic (302-7200 + 302-7210)**
- **LED Repeater Board (302-7150)**

6.8.1 Brigade / PSU Monitor Board

The API 673 Brigade/PSU Monitor Board is designed to monitor some of the Brigade board outputs, monitor and control the battery charging/power supply inputs and outputs and to provide relay outputs as shown in the Fig 5.

The Bells may be terminated to bell outputs 1 and 2 on the API 673 Brigade/PSU Monitor Board. The alarm outputs are also available on this board.

The *FireFinder*^{TM} provides a monitored bell circuit split to drive two 2 Amp circuits. Each bell circuit requires a 10K EOL resistor to give a system normal indication. If either circuit is open or shorted, the buzzer will sound on the panel and a bell fault will be indicated on the LCD in the brigade status display. These lines are monitored using a small current in reverse polarity to normal. For this reason it is necessary to connect the bells via diodes, 1N4004 diodes (1A 400V) or equivalent are recommended. Also observe bell/sounder polarity.
Relay outputs marked NO C and NC are voltage free contacts. Outputs marked +ve and -ve are fitted with monitoring resistors (10k).

For all outputs combined, total output current is 2A (if 2.5A power supply is being used).
Once you have ensured that all field wiring and devices are installed and terminated correctly the *FireFinder*^{TM} is now ready to turn on.
Turn the mains power on, and connect the batteries observing correct polarity. The green power on led should be lit.

OUTPUT RATINGS

Bell 1	2 Amp Fused (F2)
Bell 2	2 Amp Fused (F3)
Plant (Aux) Monitored	1 Amp Fused (F4)
Plant (Aux) Non-Monitored	1 Amp Voltage Free Contacts
Warn Sys (Evac) Monitored	1 Amp Fused (F5)
Warn Sys (Evac) Non-Monitored	1 Amp Voltage Free Contacts
Fault Monitored	1 Amp Fused (F6)
Fault Non-Monitored	1 Amp Voltage Free Contacts
Isolate	1 Amp Voltage Free Contacts
Alarm	1 Amp Voltage Free Contacts
Valve Monitor	1 Amp Voltage Free Contacts
Batt Fail	1 Amp Voltage Free Contacts
Battery Output	Thermistor Protected

TO CN7 OF MAIN
CONTROLLER BRD
(302-674A)

+27VDC REGULATED
POWER
(INTERNAL BOARD
POWER)

+27VDC FROM
PSU

NOTE: NC C NO DENOTES
VOLTAGE FREE CONTACTS.
NC = NORMALY CLOSED
C = COMMON
NO = NORMALY OPEN
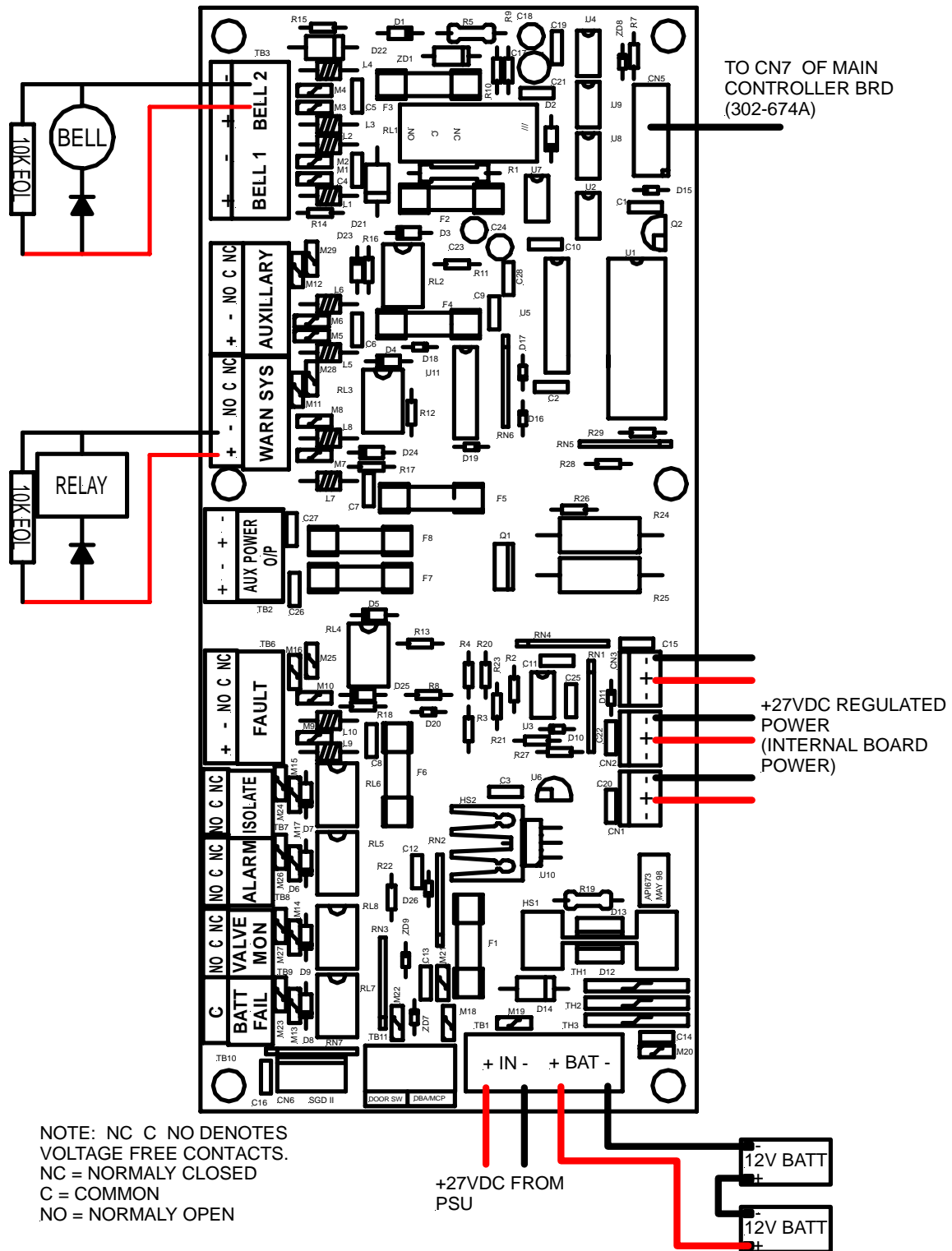
Fig 5: API-673 Brigade/PSU Monitor Board

6.8.2 Conventional Zone Board

The API-671 Conventional Zone Board provides the interface between the external conventional devices and the *FireFinder*^{TM}
Conventional zones are connected from TB4 to TB1 on the API-671 16 Zone Conventional Board.
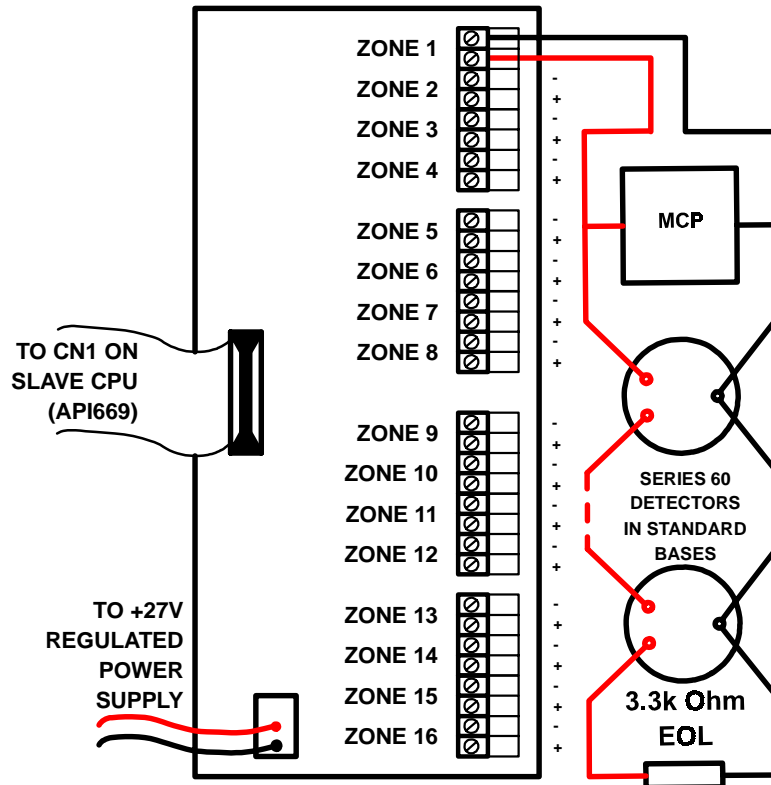
Fig 6: 16 Zone Conventional Board (API-671)

AZF Parameters

Zone Output Impedance	628 ohms ± 5%
Limits	597 - 660 Ohms

Maximum Line Voltage: The maximum line voltage is limited to the system voltage. With a nominal battery voltage of 27V, system voltage and therefore open circuit voltage would be approximately 26.4V.

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6.8.3 Addressable Loop Board

The API-670 Addressable Loop termination board provides the interface between the external addressable devices and the *FireFinder^{TM}*. Each board provides terminations for two loops. one slave CPU is required per loop. Addressable loops are connected from TB1 to TB2 on the API-670 Apollo Loop Termination Board. **Note:** L2 is +ve (positive), L1 is -ve (negative)

Connect your XP-95 loop to the panel as shown in figure 7.

AMPAC strongly recommends that the *LoopManager* is used to check that the Apollo loop is correctly installed before connecting it to the *FireFinder^{TM}*.

Loop Parameters
- 126 Apollo Devices max.
- 250mA Current Max.
- S/C protected
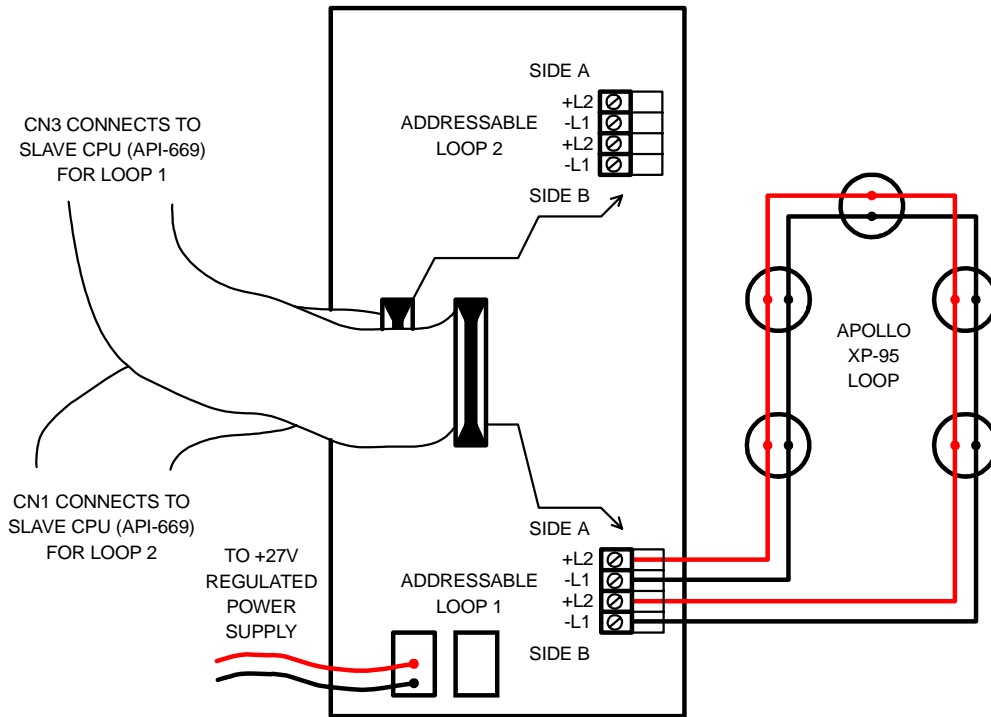
Fig 7: Apollo XP-95 Loop Termination Board (API-670)

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6.8.4 16/16 Input / Output Board

The API-672 16/16 Input / Output provides the interface between Slave modules and 8 way relay boards and the 16 Opto input boards.

The Input / Output board is connected to the slave CPU via CN1. A maximum of eight (8) Input / Output boards may be daisy chained together.
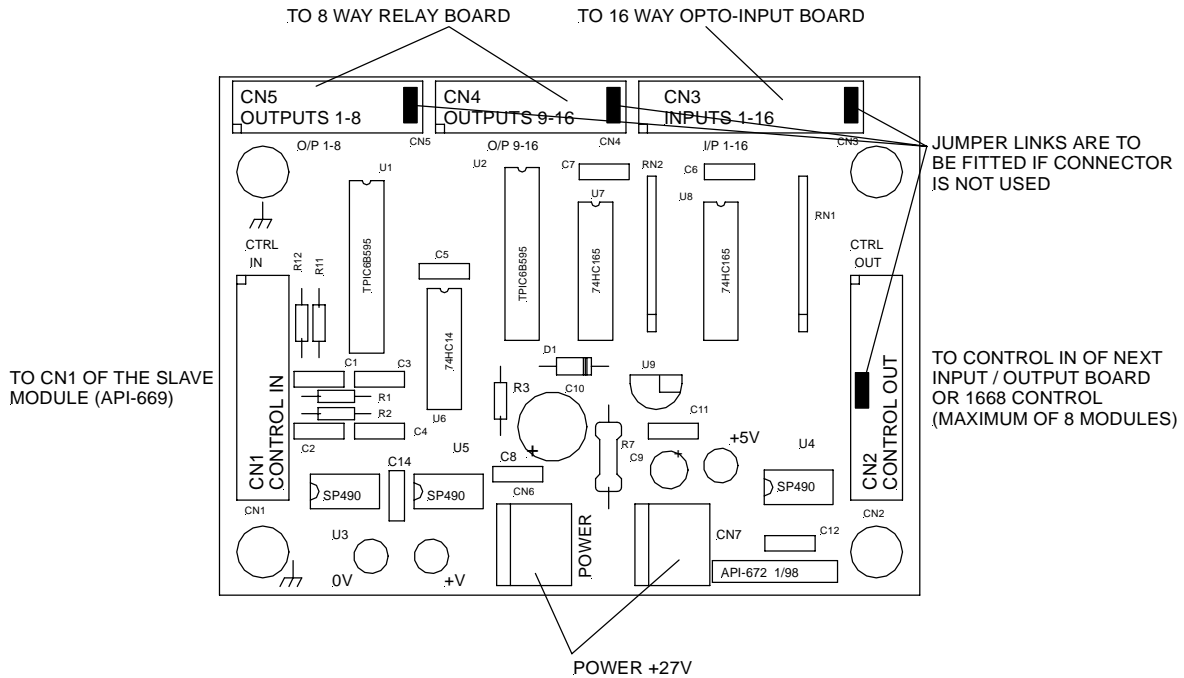
Fig 8: 16/16 Input / Output Module (API-672)

6.8.5 8 Way Relay Board

Relay Outputs: Each 8 Way Relay Board has 8 either 1A or 5A relays fitted with voltage free contacts.

TO CN5 OR CN4 ON API-672
INPUT/OUTPUT BOARD

Fig 9: 8 Way Relay Board

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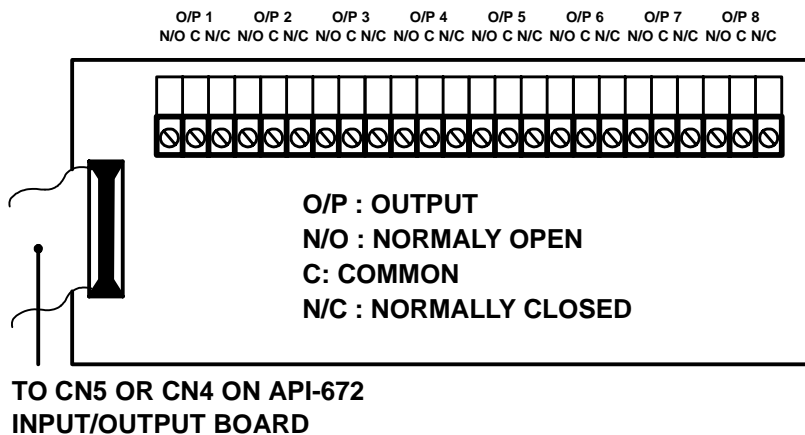
6.8.6 16 Way Input Board

Opto-Inputs: Up to 16 inputs can be connected to the 16 Way Input Board. These inputs are required to be voltage free contacts.
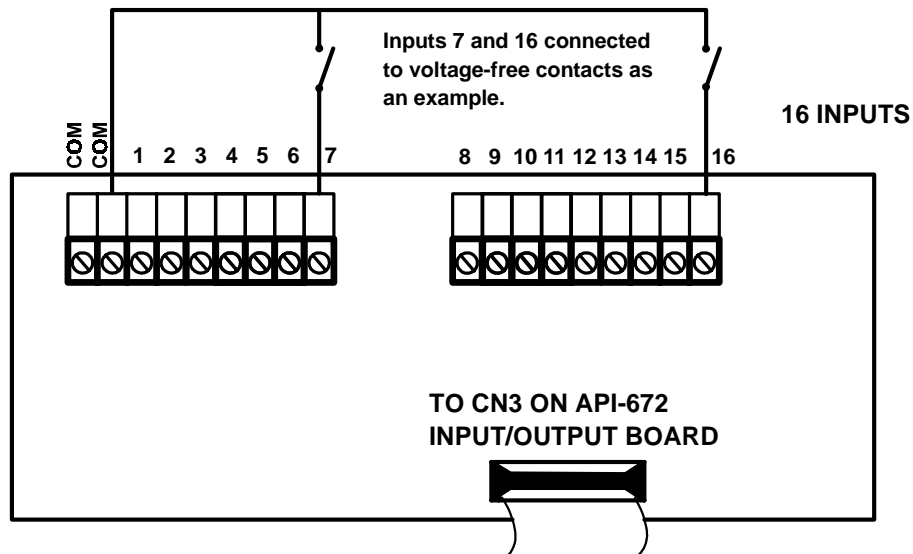
Fig 10: 16 Way Input Board (API-677)

6.8.7 AS1668 Control Module

The API-680 AS1668 control module provides control and indication of AS1668 services. Each module accommodates four rotary switch controls and LED indication for each of the four controls.

The AS1668 Control module is connected to the slave CPU via CN1. A maximum of 8 AS1668 modules may be daisy chained together.
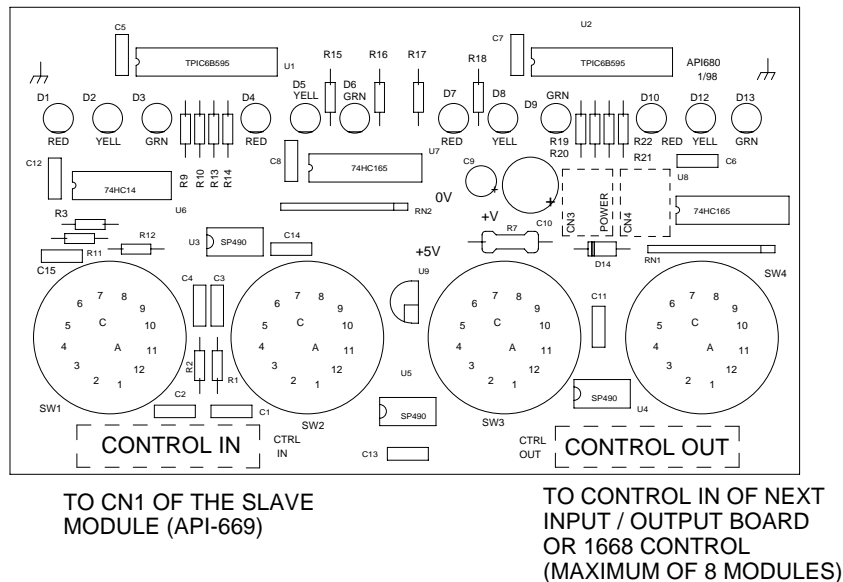
Fig 11: AS1668 CONTROL MODULE (API-680)

6.8.8   Serial Relay Board

The Serial relay board connects to the internal serial communication bus. Power is provided via 3-way panduit cable.

Relay Outputs: Each 8 Way Relay Board contains 8, 1A relays fitted with voltage free contacts.

TO IN (CN3) OF THE NEXT
SERIAL BOARD. A MAXIMUM OF
32 BOARDS CAN BE DAISY
CHAINED TOGETHER

TO CN3 OF THE MAIN
FIRFINDER PCB (API-674)
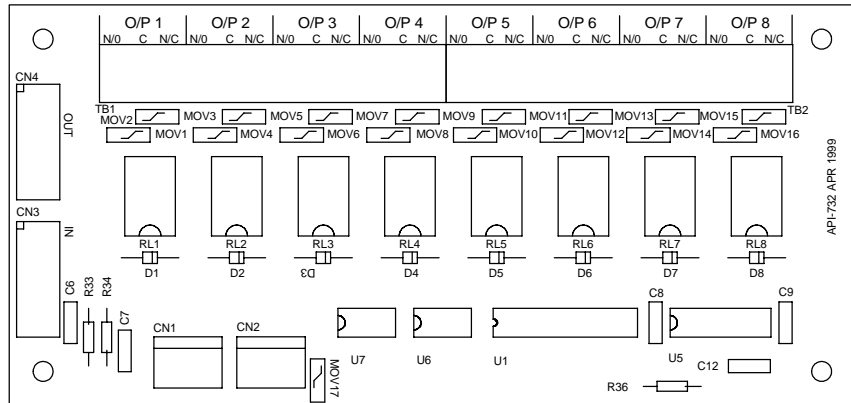
CN1 AND CN2
POWER IN 27VDC

Fig 12: Serial Relay Board (API-732)

6.8.9   32 Zone LED Mimic Board

The 32 Zone LED mimic board connects to the internal serial communication bus. It provides visual indication of zones in alarm and fault (32 alarm LED's and 32 fault LED's). A maximum of 4 boards can be daisy chained together.

TO CN3 OF THE MAIN
PCB (API-674)

TO IN (CN1) OF THE NEXT
ZONE MIMIC. A TOTAL OF
4 BOARDS CAN BE DAISY
CHAINED TOGETHER
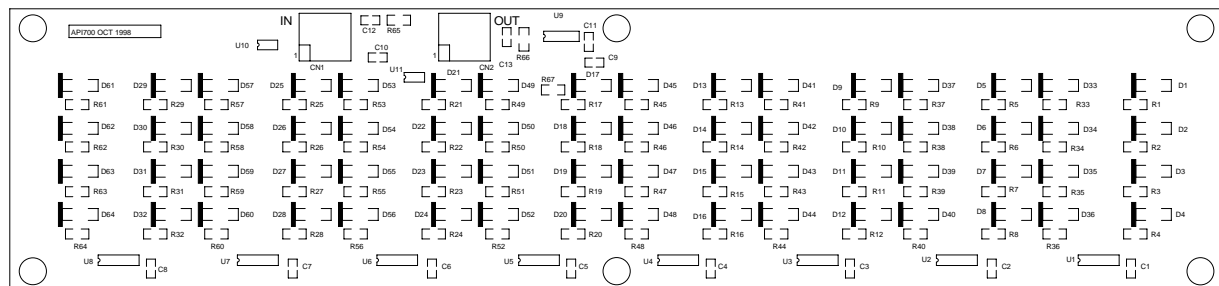
Fig 13: 32 Zone LED Mimic Board (API-700)

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6.8.10 Valve Display Module

The Valve display module connects to the internal serial communication bus. It provides visual indication of the Valve status (16 x Valve open, 16 x Valve closed). A maximum of 4 boards may be daisy chained together.
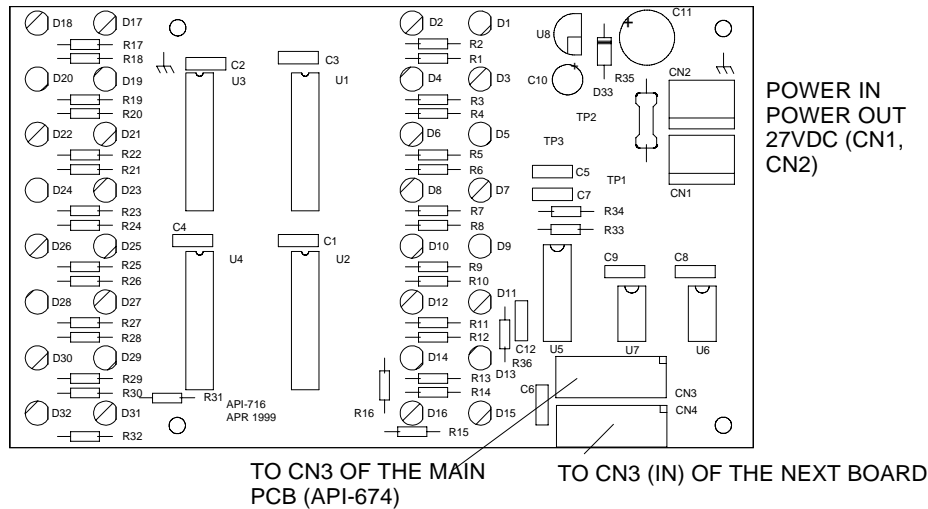
Fig 14: Valve Display Module (API-716)

6.8.11 Pump Display Module

The Pump display module connects to the internal serial communication bus. It provides visual indication of the Pump status (8 x Supply Healthy, 8 x Pump Running, 8 x Pump Fault). A maximum of 8 boards may be daisy chained together.
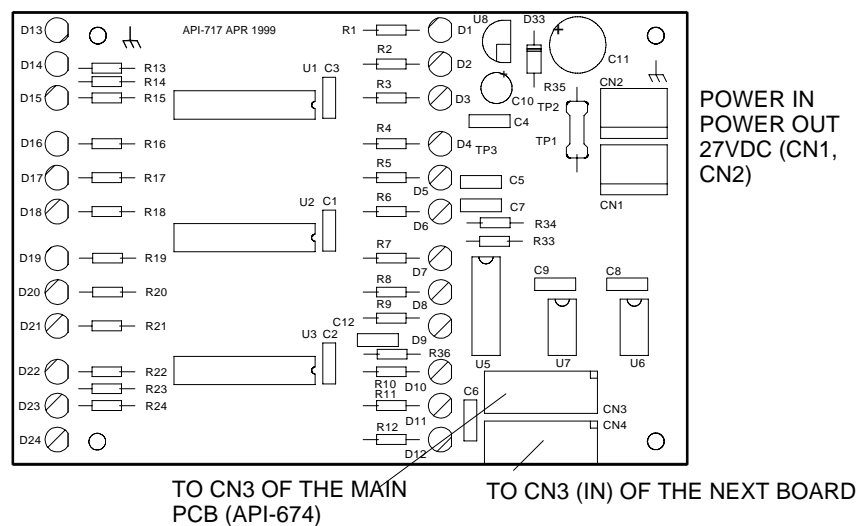
Fig 15: Pump Display Module (API-717)

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6.9 Network Compatible Modules

6.9.1 Controller Interface Card

The Controller Interface Card provides connections to the communication ports on a controller. The module connects to the Loop Communication connector (CN18) on the API-674. It may provide two communications ports (RS232 and RS485) dependant upon the mode in which it is used.
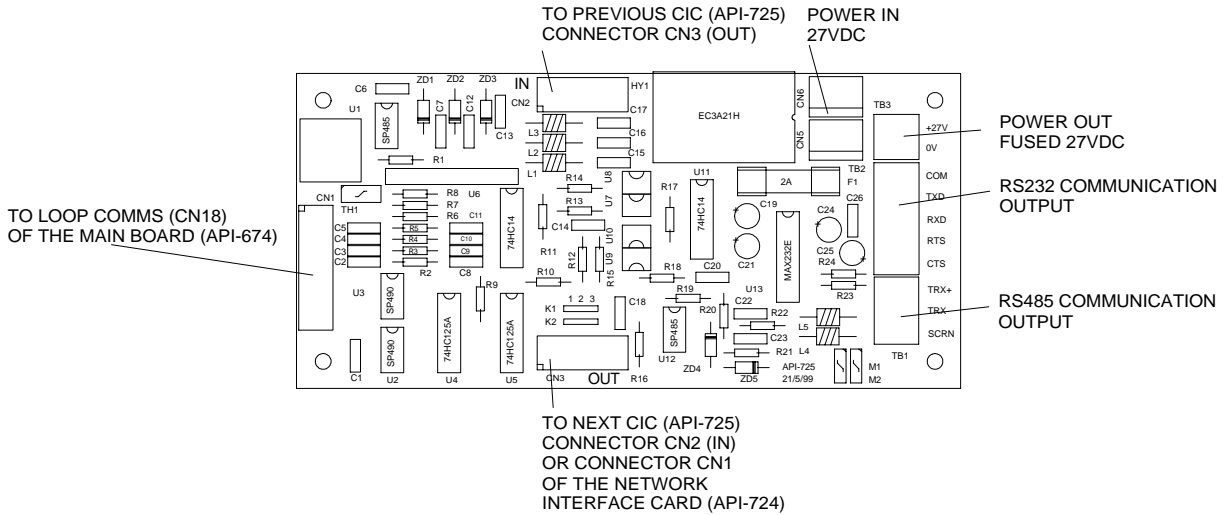
Fig 16: Controller Interface Card (API-725)

See the Technical manual for full Controller Interface Card connections

6.9.2 Network Interface Card

The Network Interface Card allows the networking of multiple controllers in different combinations, from local networking to Data Gathering panels to Peer to Peer panels. The NIC provides two communication buses RS232 and RS422. The NIC may either connect to the main board via connector CN18 (Loop Communication) or to a Controller Interface Card connector CN3 (Out)
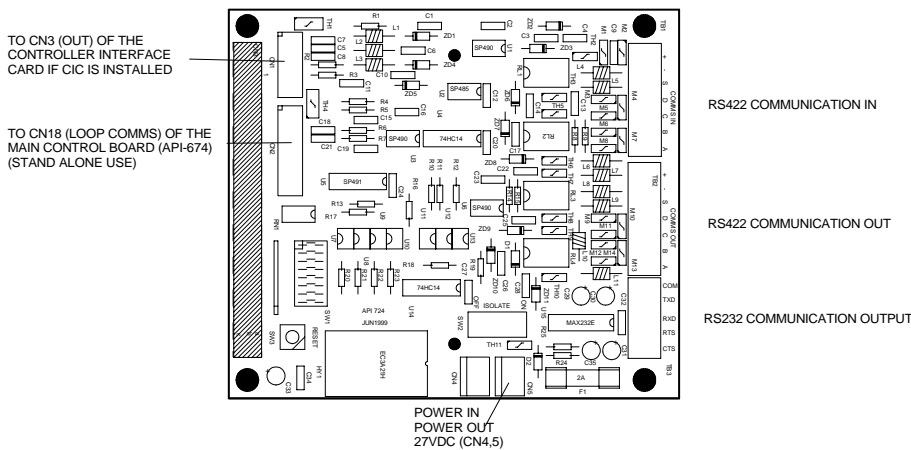
Fig 17: Network Interface Card (API-724)

See the Technical manual for full Network Interface Card connections

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6.9.3   Liquid Crystal Display Repeater Panel

The LCDR mimics all displays as those shown at the main panel (API-674). It also provides controls to interrogate the system.
The Remote LCD module connects to the external RS422 communication loop.
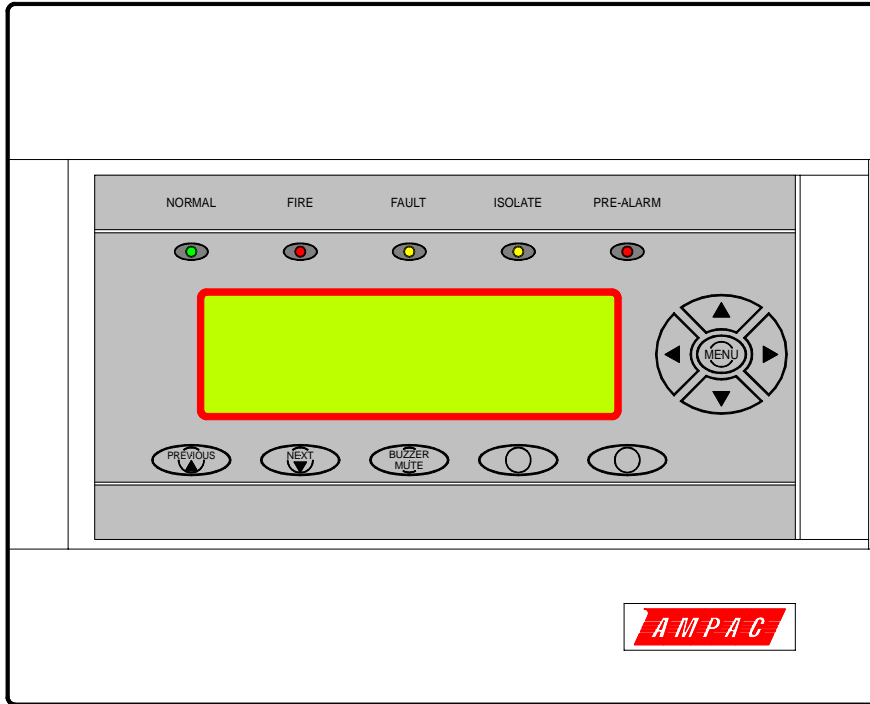
Fig 18: Liquid Crystal Display Repeater Panel
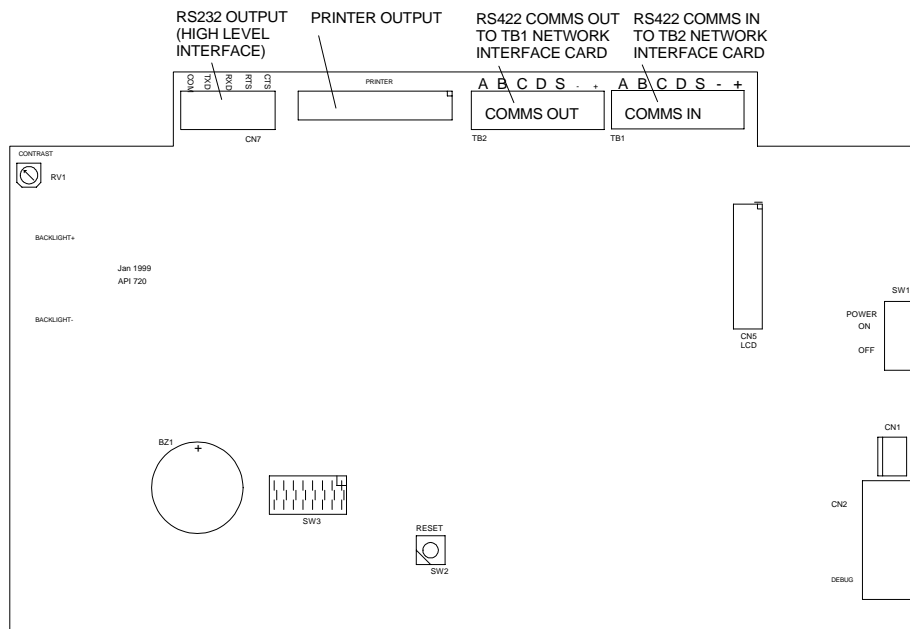
Fig 19: LCDR internals (API-720)

See the Technical manual for full LCD repeater panel connections

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6.9.4 LED Repeater Board

The LED Repeater board can be configured to display the common status of panel, (Normal, Alarm, Pre-alarm and Fault) and The ALARM status of 32 groups, zones or loop/sensors.
The LED Repeater board connects to the external RS485 Communication bus via the CIC
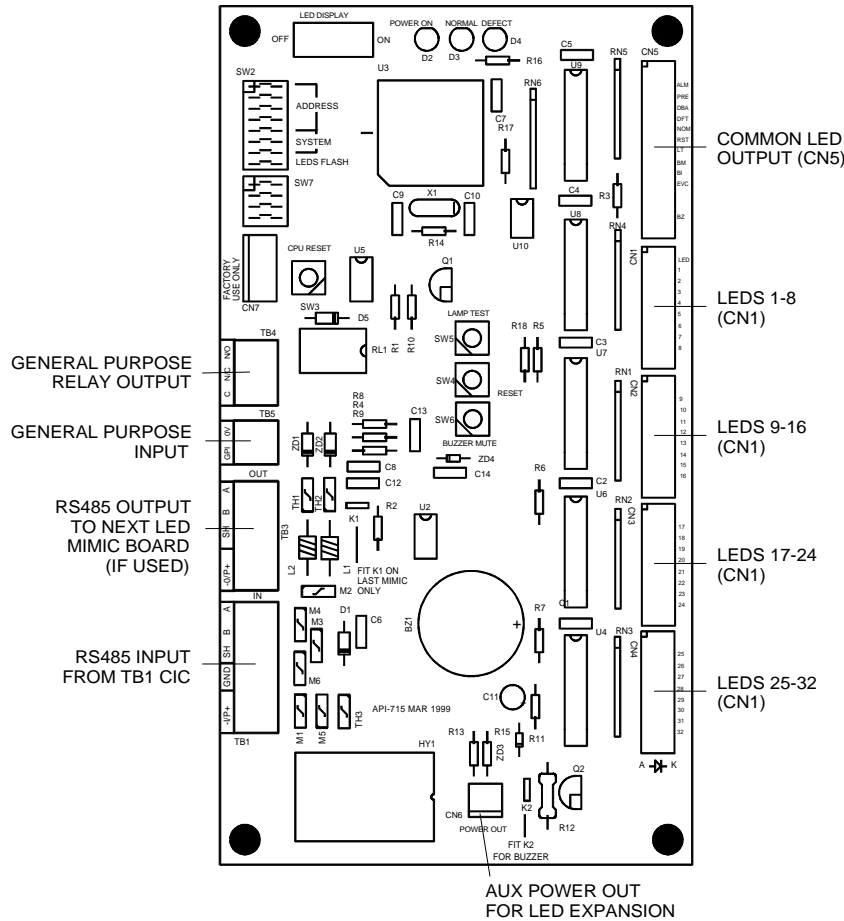
Fig 20: LED Repeater Board (API-715)

See the Technical manual for full LCD repeater panel connections

7 FireFinder^{TM} Operation

7.1 The Control Panel
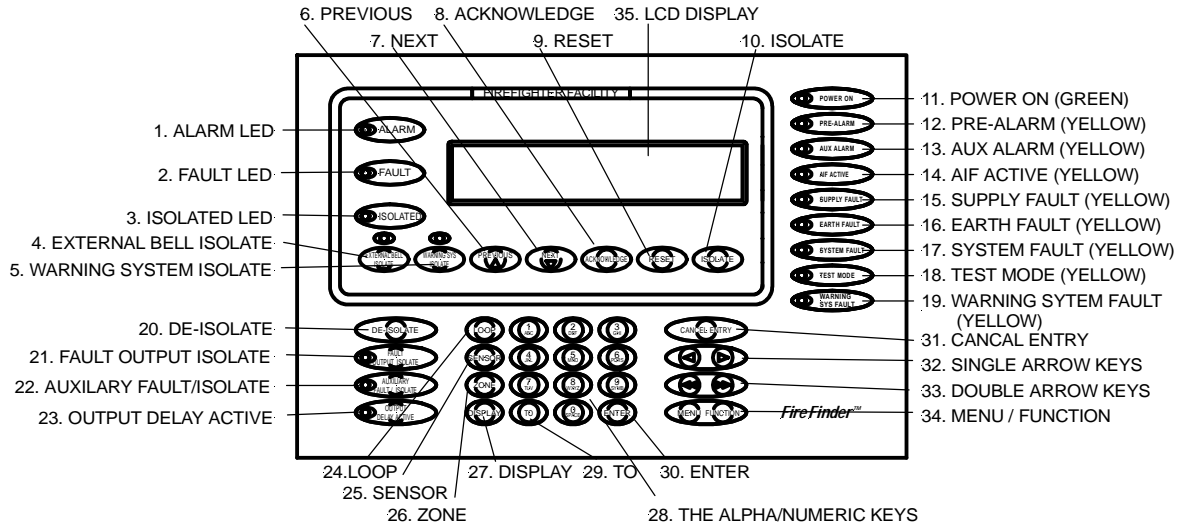
Fig21: The FireFinder^{TM} Control Panel

1. ALARM (Red) - This LED will flash if any unacknowledged alarms are present on the system. If all the alarms have been acknowledged it will light steady.

2. FAULT (Yellow) - This LED will light steady if there are any faults on the system, whether they are loop faults, module faults, device faults etc.

3. ISOLATED (Yellow) - This LED will light steady if any detectors, devices or zones in the system have been isolated.

4. EXTERNAL BELL ISOLATE (Yellow) - Pressing this button will isolate any bells connected to the fire panel If the bell is isolated the LED just above the button will glow steady yellow. Pressing the button again will de-isolate the bell.

5. WARNING SYS ISOLATE - Pressing this button will isolate the fire panel output to the Warning System if it is connected to one. If the Warning System is isolated the LED just above the button will light steady. Pressing the button again will de-isolate the Warning System output.

6. PREVIOUS - This key is used for scrolling backwards through alarms, faults, or isolates on the LCD.

7. NEXT - This key is used for scrolling forwards through alarms, faults, or isolates on the LCD.

8. ACKNOWLEDGE - Pressing this key will acknowledge an alarm currently displayed on the LCD. It will also silence the panel buzzer, which sounds whenever there is an alarm (optional) or fault.

9. RESET - Pressing this key will reset the panel, clearing any acknowledged alarms and taking the LCD display back to its default screen, unless there are any uncleared faults or isolated devices, these will continue to be displayed.

10. ISOLATE - This key is used to isolate individual or groups of detectors, devices or zones.

11. POWER ON (Green) - This LED will light when the mains power is turned on.

12. PRE-ALARM (Yellow) - This LED will light when a sensor/detector is in the pre-alarm state.

13. AUX ALARM (Yellow) - This led will light when the auxiliary alarm output has been activated.

14. AIF ACTIVE (Yellow) – "Alarm Investigation Facility" If this facility is selected, you have maximum of 30 seconds to acknowledge an alarm signal at the panel, if this is done you have a further 5 minutes (maximum) to investigate the cause of the alarm before the panel signals the fire brigade. If the panel is reset within the 30 seconds or the 5 minutes the AIF is also reset. If the alarm is not acknowledged within the 30 seconds the panel will automatically call the brigade at the end of the 30 seconds.

15. SUPPLY FAULT (Yellow) - This led will light when there is a fault on the power supply. The following conditions constitute a fault.
- The output voltage is too low (less than 26.5V)
- The output voltage is too high (greater than 28V)
- The battery is not connected properly.

16. EARTH FAULT (Yellow) - This LED will light if there is an incorrect earth on any of the signal cables of the system.

17. SYSTEM FAULT (Yellow) - This LED will light if the main system CPU is in fault.

18. TEST MODE (Yellow) - This LED will light when the panel is in any of the test modes. (EN54 ONLY)

19. WARNING SYSTEM FAULT (Yellow) - When a warning system is connected to the fire panel, this LED will light if the connection to the warning system becomes faulty.

20. DE-ISOLATE - If a detector currently displayed on the LCD has been isolated, pressing this key will de-isolate it.

21. FAULT OUTPUT ISOLATE - Pressing this button will isolate the fault output relay on the brigade board. If the FOI is isolated the associated LED will light.
Pressing the button again will de-isolate the FOI relay.

22. AUXILARY FAULT/ISOLATE - Pressing this button will isolate the auxiliary output relay on the brigade board. If the auxiliary fault / isolate is isolated the associated LED will light steady.
Pressing the button again will de-isolate the auxiliary fault / isolate relay.
The auxiliary output line is monitored, should it go into fault, the LED will flash.

23. OUTPUT DELAY ACTIVE - Pressing this button will activate the Alarm Investigation Facility as described in 14.

24. LOOP - Press this key followed by a number to select the loop you wish to access eg LOOP 4.

25. SENSOR - After selecting the Loop number using the LOOP key, press this key to enter the sensor number for the device you wish to interrogate.

26. ZONE - Press this key followed by a number eg ZONE 4 to select the required zone

27. DISPLAY - Press this key after selecting the Zone number or the Loop and Sensor numbers to display the state of the device.

28. THE ALPHA/NUMERIC KEYS - These keys are used to navigate around the panel's menus and enter data. If you are entering a descriptor, or some other data that contains characters as well as numbers, pressing the keys multiple times will scroll through the available letters written on the button, in sequence. Eg 1,A,B,C.

29. TO - Use this key to access a range of devices. Eg, 2 TO 7.

30. ENTER - You will be prompted to press the ENTER key at certain times when using the panel, to enter data.

31. CANCEL - The CANCEL ENTRY key is used to delete any data in the current field or return to the previously displayed menu.

32. SINGLE ARROW KEYS - These are used to move the cursor back and forth when entering data in a field.

33. DOUBLE ARROW KEYS - These are used to move between fields when entering data.

34. MENU / FUNCTION - Pressing the MENU key will display the main menu on the LCD. Similarly pressing the FUNCTION key will display the function menu on the LCD.

35. LCD DISPLAY - This screen can be configured with the servicing companies name and phone number. It also displays the current date, time and that the system is normal (no faults and alarms). If there are any faults or alarms the LCD will display the device in question, if multiple detectors or zones are not in their normal state, the PREVIOUS and NEXT keys are used to scroll through them.

7.2 The Default LCD Display

In its normal state the *FireFinder™* will display a screen similar to that shown below

```
FireFinder                9/9/99 12.00
SERVICED BY YOUR COMPANY
PH: 09 9999 9999
SYSTEM IS NORMAL
```
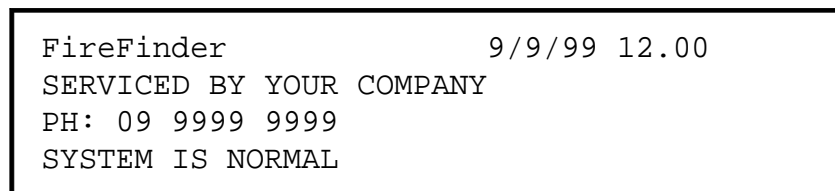
Fig 22: The Default LCD Display

This screen can be configured with the servicing company's name and phone number (via laptop or modem). It also displays the current date and time and that the system is normal (no faults and alarms)

If there are any faults or alarms the LCD will display the device in question, if multiple detectors or zones are not in their normal state, the **PREVIOUS** and **NEXT** keys are used to scroll through them.

If there is a fault condition or an alarm and the buzzer is sounding, press any key in the FireFighter Facility to stop it sounding. The FireFighter Facility is the area on the control panel bound by the red border.

7.3 Incoming Alarm Signal

Will flash common alarm indicator

- Will display location of alarm origin on the LCD
- Will activate the external bell.
- Will activate the internal FIP buzzer. (optional)
- Will activate any ancillary equipment so programmed.
- Will abort any test in progress.

The LCD will display the first alarm signal received. The LCD will also display other essential alarm information and operator prompts. The LCD back light is normally off until operator intervention. An active alarm signal must be acknowledged before any other condition can be imposed on it.

7.4 Accessing a Loop, Sensor or Zone

LOOP OR SENSOR
1. From the Keyboard, press **LOOP**
2. Enter the loop number you wish to interrogate then press **SENSOR.**
3. Press the key for the sensor number.
4. Press the **TO** key if you wish to access a range of sensors on the loop, the **DISPLAY** key if you wish to display the status if a sensor, the **ISOLATE** key if you wish to isolate a sensor, or the **DE-ISOLATE** key to de-isolate a sensor.

ZONE
1. From the Keypad, press **ZONE**
2. Press the key for the zone number.
3. Press the **TO** key if you wish to access a range of zones, the **DISPLAY** key if you wish to display the status of a zone, the **ISOLATE** key if you wish to isolate a zone, or the **DE-ISOLATE** key to de-isolate a zone.

7.5 Accessing Functions and Menus

From the default display, press **FUNCTION**, which brings up the display for entering a password giving access to the panel's functions.
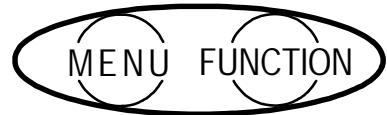
Or press **MENU** to bring up the main menu.
(See quick reference guide)

Screen prompts will guide you through the menu operations.

7.6 The Main Menu

```
MAIN MENU
0: ALARMS 1: PREALARMS 2: FAULTS
3: ISOLATES 4: STATUS 5: TESTING
SELECT No.
```

Fig 23:The Main Menu

From the main menu the user is able to view any Acknowledged alarms on the system. You can also view any pre-alarms, faults or isolates on the system. If there are no alarms, faults or isolated zones or devices, a message will display for about a second and the display will then return to the previous menu.

7.6.1 Status Menu

```
STATUS MENU
0: LOOPS 1: MODULES 2: P/SUPPLY 3: BRIGADE
4: I/O 5: NETWORK 6: SYSTEM 7: AVALUES
SELECT No.
```

Fig 24: The Status Menu

Press 4 while on the Main Menu to display the Status Menu.
From the status menu you can interrogate the status of all of the system components and settings listed below

0. **Loops:** Enter the loop number and it will display its status.

1. **Modules:** Enter the module number and it will display the type, the software version and its status.

2. **Supply:** This will display the charger voltage, whether or not the power supply is in fault, and if the battery is correctly fitted.

3. **Brigade:** This will display the status of all of the brigade relays and outputs on the brigade board.

4. **I/O:** Can display the status of the input output in a panel or on a loop. You must enter the I/O module number, then the input or output on that module (or the loop and sensor number and the output on that device) it will then give you a description of what that input or output does and tells you its current state.

5. **Network:** Display the status of the network.

6. **System:** This will display the status of the system. eg Faults, Alarms, Isolates.

7. **A values:** This will display the analog value being returned by a detector. It will display the description of the detector, as well as its type, its state and the Raw Analog Value in counts.

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7.6.2 Testing Menu

```
TESTING MENU
0: ALARM 1: FAULT 2: SYSTEM 3: LAMP


SELECT No.
```
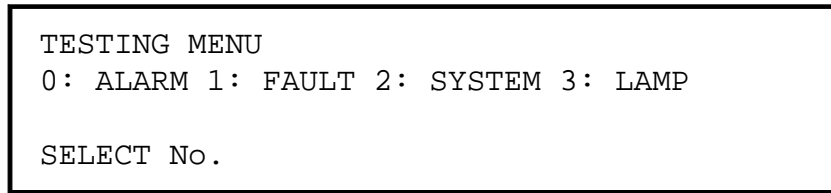
Fig 25: The Testing Menu

This menu is selected by pressing 5 while on the Main Menu. From here the following can be tested

    0. Alarm Test: Alarm tests either a zone or a sensor or a range of zones or sensors.

    1. Fault Test: Fault tests either a zone or a sensor or a range of zones or sensors.

    2. System Test: Will perform a system test (a basic test of all parts in the system)

    3. Lamp Test: Will flash the LED's on the front panel and test the LCD display.

7.7 Function Menu

The function menu provides access to many programming and configuration functions. These features are protected by a password (actually a pass-number as it can only contain numbers) to prevent unauthorised tampering with the panel's configuration. A new panel will have the password **3333** already programmed so that you can enter your own.

To get to the functions menu press **FUNCTION** while the panel is on the Default Display. You must then enter a password. Three levels of password have been defined so that access to certain facilities can be restricted (such as the ability to enter new passwords).

- **Level I:** Allows access to:
  - **Date:** Enter the Day, Month and Year (4-digit year).
  - **Time:** Enter the hours (24-hour mode) and minutes.
  - **Day/Night Settings:** Not currently active.
  - **Logs:** Alarm and Fault logs.
  - **Tests:** Walk and loop tests.

- **Level II:** In addition to the level I facilities, adds the following:
  - **I/O**
  - **Programming**

- **Level III:** In addition to the level II facilities, adds the following
  - **Password**

```
LEVEL III MAIN FUNCTIONS
0: DATE 1: TIME 2: DAY/NIGHT SETTINGS
3: LOGS 4: TESTS 5: I/O 6: PROG 7: PASSWORDS
SELECT No.
```
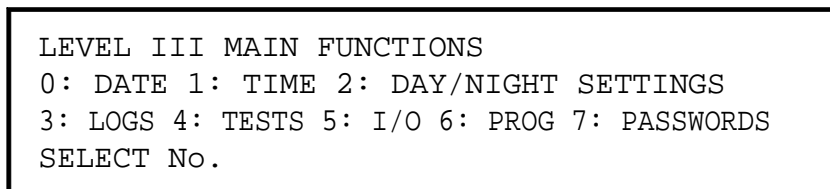
Fig 26: The Level III Functions Menu

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7.7.1 Forgotten Passwords

If you have forgotten your password, enter 9999 into the password field. You will then be given a 4 digit password key. You must then contact the AMPAC head office and quote the number you have been given. We can then issue you with a temporary password, allowing you access to the level 3 functions so that you can program a new password. The temporary password will become invalid if you enter 9999 again or if the panel is re-powered.

7.8 Manual I/O Control

With the *FireFinder^{TM}* it is possible to manually override the inputs and outputs within a system. Providing an input or an output has been programmed into the *FireFinder^{TM}* then it is possible to use this menu as described below. This menu can be used in commissioning or manual checking of I/O.

```
MANUAL I/O CONTROL
0: INPUT 1: OUTPUT
3: REMOVE ALL MANUAL CONTROL
SELECT No.
```

Fig 27: The Manual I/O Control Menu

Press 5 while on the Main Functions menu to display the Manual I/O Control menu

0. Input:

   0. In a Panel: Enter the I/O Controller number then the input number, This will display the descriptor for the input and its current state, you can then turn the input on or off or remove manual control.
   1. On a Loop: Enter the loop number, the sensor number and the input number. This will display the descriptor for the input and its current state, you can then turn the input on or off or remove manual control.
   2. Remove All Manual Input Control: Will remove all manual input control.

1. Output: Same as above for inputs but for outputs.

2. Remove All Manual Control: Will remove all manual control.

7.9 Programming

```
PROGRAMMING MENU
0: ZONE 1: SENSOR 2: INPUT 3: OUTPUT


SELECT No.
```
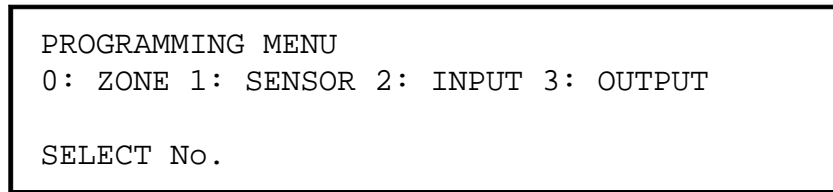
Fig 28: The Programming Menu

Press 6 while on the Main Functions menu (if your password gives you access) to display the Programming Menu.

0. Zone: Enter the zone number and you can change the descriptor (press the numeric keys multiple times to access characters, use **< >** keys to move the flashing underline which indicates the cursor position) You can also change its type. Press **<<** and **>>** to move between fields. You can also go to a second screen (by pressing **>>** to go through all the fields) to show the brigade options:

> **Alarm:**
> **Bell:**
> **Auxiliary:**
> **Warning:**
> **Sprinkler:**
> **Alarm Led:**
> **Configuration:**

You can then go to a third screen showing the "GROUPS".

After scrolling through the groups you are prompted to press **ENTER** to confirm your changes.

1. Sensor: Enter the loop and sensor number. You can then edit the Descriptor and type. You can go to a second screen and allocate the sensor to a zone, and give set the device type. You can then scroll to yet another screen displaying the brigade options as described above. You can then scroll to a screen allowing you to set the day/night settings. The next screen is the groups screen.(see below) After scrolling through the groups you are prompted to press enter to confirm your changes.

2. Input: Allows you to Add, Edit or delete inputs in a panel or on a loop.

3. Output: Allows you to Add, Edit or delete outputs in a panel or on a loop.

4. Groups: A "GROUP" is defined as a collection of actuating devices with a common purpose. In the *FireFinder*^{TM} we are able to assign a "GROUP" to zones and sensors. This enables programming to be simplified.

7.10 Passwords

```
PASSWORD MENU
0: ADD PASSWORD 1: DELETE PASSWORD
2: DELETE ALL PASSWORDS
SELECT No.
```

Fig 29: The Password Menu

Press 7 while on the Main Functions menu (if your password gives you access) to display the Password Menu.

0. Add Password: Enter the new password, then press **ENTER**. The password is a 4 digit number.

1. Delete Password: Enter the password that you want to delete, then press **ENTER**.

2. Delete All Passwords: This ask you to confirm that you want to delete all the passwords, press **ENTER** then **ENTER** again.

8 List of Compatible Devices

Conventional Detectors

The following range of conventional detectors have approval to be used with the *FireFinder*^{TM} conventional zone board (API-671). See Fig 6 for connection details

Actuating Device	Maximum No Of Devices
Apollo Series 60, 55000-105AUS Type A heat	40
Apollo Series 60, 55000-106AUS Type B heat	40
Apollo Series 60, 55000-107AUS Type C heat	40
Apollo Series 60, 55000-108AUS Type D heat	40
Apollo Base 45681-200 (for above detectors)	
Apollo Series 60, 55000-240AUS Ionisation Smoke	40
Apollo Series 60, 55000-310AUS Photoelectric Smoke	40
Apollo Series 60, 53546-014AUS Duct Sampling Unit	40
Apollo Base 45681-205 (for above detectors)	
AMPAC Fireray 2000 Beam Detector	40
AMPAC FP/2 Manual Call Point	40
DEMCO D-101 Manual Call Point	40
DEMCO D-108 Manual Call Point	40
Hochiki DCA-B-60R Mk V Type A Heat	40
Hochiki DCC-A Type A Heat	40
Hochiki DFE-60B Type B Heat	40
Hochiki DCA-B-90R Mk1 Type C Heat	40
Hochiki DCC-C Type C Heat	40
Hochiki DFE-90D Type D Heat	40
Hochiki Bases YBF-RL/4AH4M, YBC-R/3A and YBC-RL/3JM (for above Hochiki detectors	
Hochiki DCD-A Type A Heat	40
Hochiki DFJ-60B Type B Heat	40
Hochiki DCD-C Type C Heat	40
Hochiki DFJ-90D Type D Heat	40
Hochiki SIJ-AS Ionisation Smoke	40
Hochiki SIJ-ASN Ionisation Smoke	40
Hochiki SLR-AS Photoelectric Smoke	40
Hochiki Bases YBN-R/4A and YBO-R/4A (for above detectors)	40
Hochiki SIH-AM Ionisation Smoke	40
Hochiki SIH-AMB Ionisation Smoke	40
Hochiki SLK-A Photoelectric Smoke	40
Hochiki Bases YBF-RL/4AH4M and YBF-RL/3JM	40

Addressable Detectors

The following range of addressable detectors have approval to be used with the *FireFinder*™ addressable Loop board (API-670). See Fig 7 for connection details

Actuating Device	Maximum No Of Devices
Apollo XP95 Base	
Apollo XP95 Isolator plus Base	
Switch Monitor Plus	
Mini Switch Monitor	
Sounder Control Unit	
Input/Output Unit	
Apollo XP95 Ionisation Smoke Monitor	
Apollo XP95 Optical Smoke Monitor	
Apollo XP95 Optical Smoke Monitor	
Apollo XP95 Temperature Monitor	
AMPAC 3-IOD 3 input / 3 output device	
AMPAC SID Single Input Device	
Apollo Discovery Type C	
Apollo Discovery Type D	
Apollo XP95 Intrinsically Safe Protocol Translator	
Apollo Discovery multisensor (LPC)	

9 Certification Information

The *FireFinder*^{TM} was designed by and is manufactured by:

AMPAC TECHNOLOGIES

Head Office:

> 97 Walters Drive
>
> Osborne Park 6017
>
> Western Australia
>
> PH: 61-8-9242 3333
>
> FAX: 61-8-9242 3334

Manufactured to: AS1603.4

SSL Certificate of Compliance Number: AFP 1168

Equipment Serial Number:

Date of Manufacture:

10 Operational Parameters

Temperature: -5ºC to +45ºC

Humidity: 45% to 75%

Cable Loop Characteristics: 2 core 1.5mm² Radox

Maximum Number of Devices per AZC: 40

Maximum Number of Devices per Loop: 126

Power Supply Output Voltage: 27V

Power Supply Output Current: 2A

Power Supply Input: 240V AC mains

Panel Current Draw: 450 mA

Battery Type and Capacity: 2 x 12V sealed lead-acid batteries (capacity determined by style of panel)

Minimum Operating Voltage: 19.2 V

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11   Troubleshooting Chart

Problem	Solution
No Mains Power	Check mains Fuse
Supply fault LED illuminated	Check output voltage it should be set to 27.6V. Low = (less than 26.5V) High = (greater than 28V) Check the battery has been connected properly
Earth Fault LED illuminated	Check all input and output cabling and wiring assemblies for short to ground
System Fault LED illuminated	Ensure correct software is installed Check all connections for loose wiring
Warning System Fault LED illuminated	Check correct E.O.L is fitted (10K) Check wiring is connected correctly
Maintenance Fault cleared but *FireFinder^{TM}* still displays Maintenance Fault	Panel needs to be reset (Power down Power up)
LCD displays LOOP (No) open circuit	Check in and out legs are connected correctly at the loop termination board
Unable to clear an O/C or S/C on a loop	You must perform a loop test to clear the fault. This is a level 1 function.
Communication Loop not working	Check for correct software installed in all communication boards. Check LCD at Main controller this may identify where there is a break in the communication line
Cant access Function menu	Incorrect Passwords entered
Forgotten passwords	Ring AMPAC and directions will be given to provide you with a temporary code
An Analogue Fault occurs when using a Zone Monitor to monitor a switch.	A 1.8k Ohm resistor must be placed in series with the switch contracts.
Bell Fault	Ensure 10K Ohm EOL resistor fitted and a diode (1N4004) in series with the bell.

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12 Appendix

APPENDIX A - BINARY ADDRESS SETTING (APOLLO)
SERIES XP95 - ADDRESS DATA
DIL SWITCH: ON = 1 OFF = 0(I/O DEVICES) ADDRESS TAG FOR DETECTORS

ADRESS 1234567	ADRESS 1234567
01 = 1000000	64 = 0000001
02 = 0100000	65 = 1000001
03 = 1100000	66 = 0100001
04 = 0010000	67 = 1100001
05 = 1010000	68 = 0010001
06 = 0110000	69 = 1010001
07 = 1110000	70 = 0110001
08 = 0001000	71 = 1110001
09 = 1001000	72 = 0001001
10 = 0101000	73 = 1001001
11 = 1101000	74 = 0101001
12 = 0011000	75 = 1101001
13 = 1011000	76 = 0011001
14 = 0111000	77 = 1011001
15 = 1111000	78 = 0111001
16 = 0000100	79 = 1111001
17 = 1000100	80 = 0000101
18 = 0100100	81 = 1000101
19 = 1100100	82 = 0100101
20 = 0010100	83 = 1100101
21 = 1010100	84 = 0010101
22 = 0110100	85 = 1010101
23 = 1110100	86 = 0110101
24 = 0001100	87 = 1110101
25 = 1001100	88 = 0001101
26 = 0101100	89 = 1001101
27 = 1101100	90 = 0101101
28 = 0011100	91 = 1101101
29 = 1011100	92 = 0011101
30 = 0111100	93 = 1011101
31 = 1111100	94 = 0111101
32 = 0000010	95 = 1111101
33 = 1000010	96 = 0000011
34 = 0100010	97 = 1000011
35 = 1100010	98 = 0100011
36 = 0010010	99 = 1100011
37 = 1010010	100 = 0010011
38 = 0110010	101 = 1010011
39 = 1110010	102 = 0110011
40 = 0001010	103 = 1110011
41 = 1001010	104 = 0001011
42 - 0101010	105 = 1001011
43 = 1101010	106 = 0101011
44 = 0011010	107 = 1101011
45 = 1011010	108 = 0011011
46 = 0111010	109 = 1011011
47 = 1111010	110 = 0111011
48 = 0000110	111 = 1111011
49 = 1000110	112 = 0000111
50 = 0100110	113 = 1000111
51 = 1100110	114 = 0100111
52 = 0010110	115 = 1100111
53 = 1010110	116 = 0010111
54 = 0110110	117 = 1010111
55 = 1110110	118 = 0110111
56 = 0001110	119 = 1110111
57 = 1001110	120 = 0001111
58 = 0101110	121 = 1001111
59 = 1101110	122 = 0101111
60 = 0011110	123 = 1101111
61 = 1011110	124 = 0011111
62 = 0111110	125 = 1011111
63 = 1111110	126 = 0111111

13 Glossary Of Terms

ACF : ANCILLARY CONTROL FACILITY

ACKD : ACKNOWLEDGED

AHU : AIR HANDLING UNIT

ALM : ALARM

AVF : ALARM VERIFICATION FACILITY

AZF : ALARM ZONE FACILITY

C : RELAY COMMON CONTACT (WIPER)

CN : CONNECTOR

CPU : COMMON PROCESSOR UNIT

DCV : DIRECT CURRENT VOLTS

EARTH : BUILDING EARTH

EOL : END OFF LINE

FDS : FIRE DETECTION SYSTEM

FIP : FIRE INDICATOR PANEL

FLT : FAULT

GND : GROUND (0 VOLTS) NOT EARTH

I/O : INPUT/OUTPUT

LCD : LIQUID CRYSTAL DISPLAY

MAF : MASTER ALARM FACILITY

MCP : MANUAL CALL POINT

MOV : METAL OXIDE VARISTOR (TRANSIENT PROTECTION)

N/C : NORMALLY CLOSED RELAY CONTACTS

N/O : NORMALLY OPENED RELAY CONTACTS

PCB : PRINTED CIRCUIT BOARDS

P/S : POWER SUPPLY

PSM : POWER SUPPLY MODULE

REM : REMOTE

SPOT : SINGLE PERSON OPERATING TEST

TB : TERMINAL BLOCK

14 Definitions

Addressable system - a fire alarm and detection system that contains addressable alarm zone facilities or addressable control devices.

Alarm verification facility (AVF) - that part of the CIE, which provides an automatic resetting function for spurious alarm signals so that they will not initiate master alarm facility (MAF), or ACF functions inadvertently. This is set by using the *Config-Manager* prior to downloading to *FireFinder*^{TM}

Alarm zone - the specific portion of a building or complex identified by a particular alarm zone facility.

Alarm zone circuit (AZC) - the link or path that carries signals from an actuating device(s) to an alarm zone facility(s).

Alarm zone facility (AZF) - that part of the control and indicating equipment that registers and indicates signals (alarm and fault) received from its alarm zone circuit. It also transmits appropriate signals to other control and indicating facilities.

Alert signal - an audible signal, or combination of audible and visible signals, from the emergency warning system to alert wardens and other nominated personnel as necessary to commence prescribed actions.

Ancillary control facility (ACF) - that portion of the control and indicating equipment that on receipt of a signal initiates predetermined actions in external ancillary devices.

Ancillary equipment - remote equipment connected to FIP.

Ancillary relay - relay within FIP to operate ancillary equipment.

Ancillary output - output for driving ancillary equipment.

Approved and approval - approved by, or the approval of, the Regulatory Authority concerned.

Card detect line - a link on a module connector to indicate the disconnection of the module.

Control and indicating equipment (CIE) - a combination of control equipment and indicating equipment.

Conventional System - is a fire detection system using a dedicated circuit for each alarm zone.

Distributed system - a fire alarm and detection system where sections of the control and indicating equipment are remotely located from the fire indicator panel or where sub-indicator panel(s) communicate with a main fire indicator panel.

Factory connections - are connections made during manufacture and should not require any field alterations.

Field connections - are connections made to FIP or ancillary equipment at the project during installation.

Fire alarm system - an arrangement of components and apparatus for giving an audible, visible, or other perceptible alarm of fire, and which may also initiate other action.

Fire detection system - an arrangement of detectors and control and indicating equipment employed for automatically detecting fire and initiating other action as arranged.

Fire indicator panel (FIP) - a panel on which is mounted an indicator or indicators together with associated equipment for the fire alarm or sprinkler system.

Fire resisting - an element of construction, component or structure which, by requirement of the Regulatory Authority, has a specified fire resistance.

Indicating equipment - the part of a fire detection and or alarm system, which provides indication of any warning signals (alarm and fault), received by the control equipment.

Interface - The interconnection between equipment that permits the transfer of data.

Main equipment - equipment essential to the operation of the system including, control equipment, amplification equipment and power supply modules.

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Master alarm facility (MAF) - that part of the control and indicating equipment which receives alarm and fault signals from any alarm zone facility and initiates the common signal (alarm and/or fault) for transmission to the fire control station where appropriate. Bells and other ancillary functions may be initiated from this facility.

Power Supply - that portion of the control and indicating equipment (CIE) which supplies all voltages necessary for operation of the CIE.

Regulatory Authority - an authority administering Acts of Parliament or Regulations under such Acts.
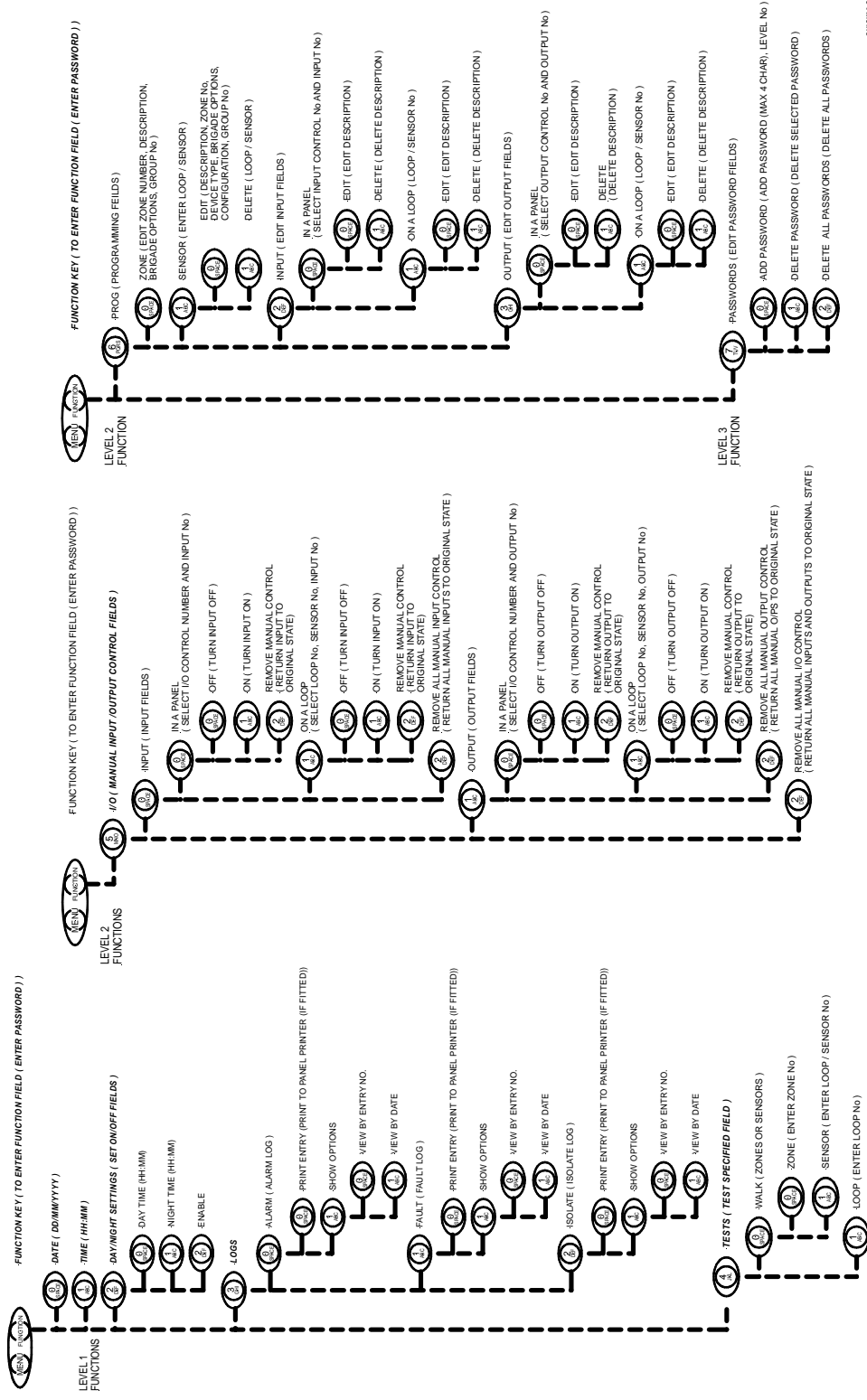
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15 Quick Reference Guides

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FireFinderTM Quick Reference

QUICK22.CAD

FUNCTION KEY (TO ENTER FUNCTION FIELD (ENTER PASSWORD))

LEVEL 2
FUNCTION

PROG (PROGRAMMING FIELDS)

ZONE (EDIT ZONE NUMBER, DESCRIPTION, BRIGADE OPTIONS, GROUP No)

SENSOR (ENTER LOOP / SENSOR)

EDIT (DESCRIPTION, ZONE No, DEVICE TYPE, BRIGADE OPTIONS, CONFIGURATION, GROUP No)

DELETE (LOOP / SENSOR)

INPUT (EDIT INPUT FIELDS)

IN A PANEL (SELECT INPUT CONTROL No AND INPUT No)

EDIT (EDIT DESCRIPTION)

DELETE (DELETE DESCRIPTION)

ON A LOOP (LOOP / SENSOR No)

EDIT (EDIT DESCRIPTION)

DELETE (DELETE DESCRIPTION)

OUTPUT (EDIT OUTPUT FIELDS)

IN A PANEL (SELECT OUTPUT CONTROL No AND OUTPUT No)

EDIT (EDIT DESCRIPTION)

DELETE (DELETE DESCRIPTION)

ON A LOOP (LOOP / SENSOR No)

EDIT (EDIT DESCRIPTION)

DELETE (DELETE DESCRIPTION)

PASSWORDS (EDIT PASSWORD FIELDS)

ADD PASSWORD (ADD PASSWORD (MAX 4 CHAR), LEVEL No)

DELETE PASSWORD (DELETE SELECTED PASSWORD)

DELETE ALL PASSWORDS (DELETE ALL PASSWORDS)

LEVEL 3
FUNCTION

FUNCTION KEY (TO ENTER FUNCTION FIELD (ENTER PASSWORD))

I/O (MANUAL INPUT / OUTPUT CONTROL FIELDS)

LEVEL 2
FUNCTIONS

INPUT (INPUT FIELDS)

IN A PANEL (SELECT I/O CONTROL NUMBER AND INPUT No)

OFF (TURN INPUT OFF)

ON (TURN INPUT ON)

REMOVE MANUAL CONTROL (RETURN INPUT TO ORIGINAL STATE)

ON A LOOP (SELECT LOOP No, SENSOR No, INPUT No)

OFF (TURN INPUT OFF)

ON (TURN INPUT ON)

REMOVE MANUAL CONTROL (RETURN INPUT TO ORIGINAL STATE)

REMOVE ALL MANUAL INPUT CONTROL (RETURN ALL MANUAL INPUTS TO ORIGINAL STATE)

OUTPUT (OUTPUT FIELDS)

IN A PANEL (SELECT I/O CONTROL NUMBER AND OUTPUT No)

OFF (TURN OUTPUT OFF)

ON (TURN OUTPUT ON)

REMOVE MANUAL CONTROL (RETURN OUTPUT TO ORIGINAL STATE)

ON A LOOP (SELECT LOOP No, SENSOR No, OUTPUT No)

OFF (TURN OUTPUT OFF)

ON (TURN OUTPUT ON)

REMOVE MANUAL CONTROL (RETURN OUTPUT TO ORIGINAL STATE)

REMOVE ALL MANUAL I/O CONTROL (RETURN ALL MANUAL INPUTS AND OUTPUTS TO ORIGINAL STATE)

FUNCTION MENU OPTIONS

FUNCTION KEY (TO ENTER FUNCTION FIELD (ENTER PASSWORD))

LEVEL 1
FUNCTIONS

DATE (DD/MM/YYYY)

TIME (HH:MM)

DAY/NIGHT SETTINGS (SET ON/OFF FIELDS)

DAY TIME (HH:MM)

NIGHT TIME (HH:MM)

ENABLE

LOGS

ALARM (ALARM LOG)

PRINT ENTRY (PRINT TO PANEL PRINTER (IF FITTED))

SHOW OPTIONS

VIEW BY ENTRY NO.

VIEW BY DATE

FAULT (FAULT LOG)

PRINT ENTRY (PRINT TO PANEL PRINTER (IF FITTED))

SHOW OPTIONS

VIEW BY ENTRY NO.

VIEW BY DATE

ISOLATE (ISOLATE LOG)

PRINT ENTRY (PRINT TO PANEL PRINTER (IF FITTED))

SHOW OPTIONS

VIEW BY ENTRY NO.

VIEW BY DATE

TESTS (TEST SPECIFIED FIELD)

WALK (ZONES OR SENSORS)

ZONE (ENTER ZONE No)

SENSOR (ENTER LOOP / SENSOR No)

LOOP (ENTER LOOP No)